

L. A. MARTHA.  
INTERNAL COMBUSTION ENGINE.  
APPLICATION FILED NOV. 23, 1907.

970,251.

Patented Sept. 13, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

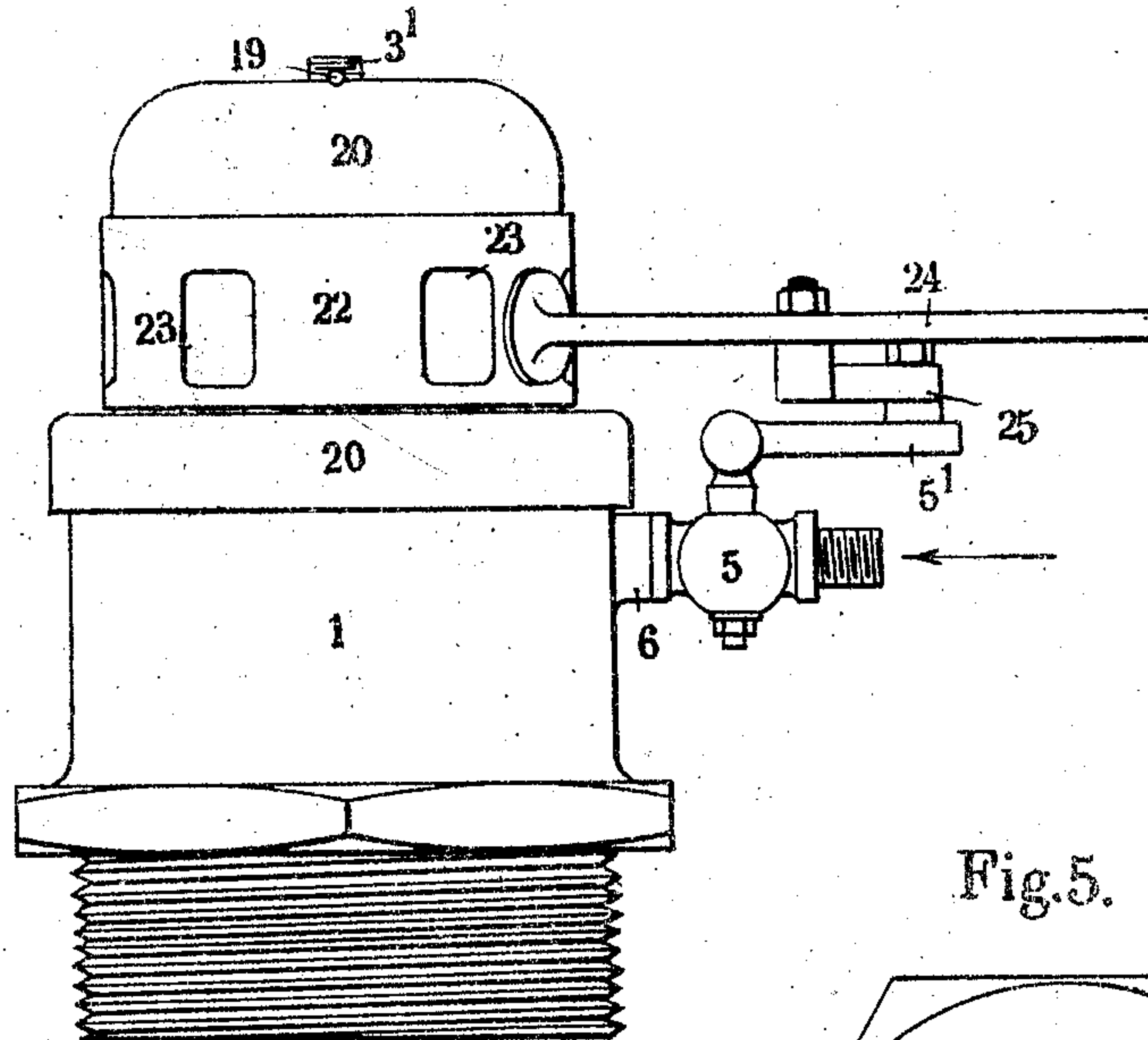


Fig. 5.

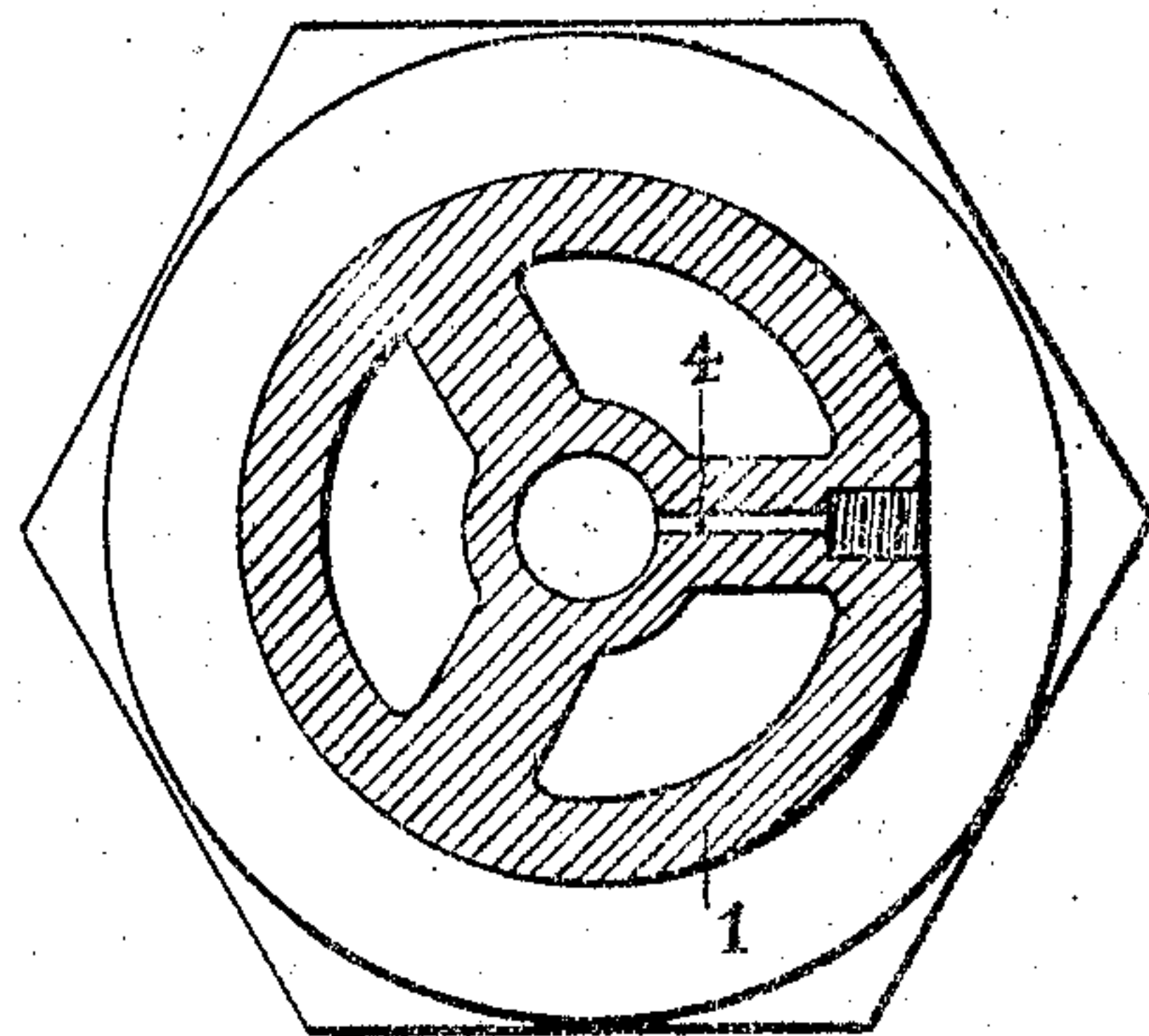


Fig. 4.

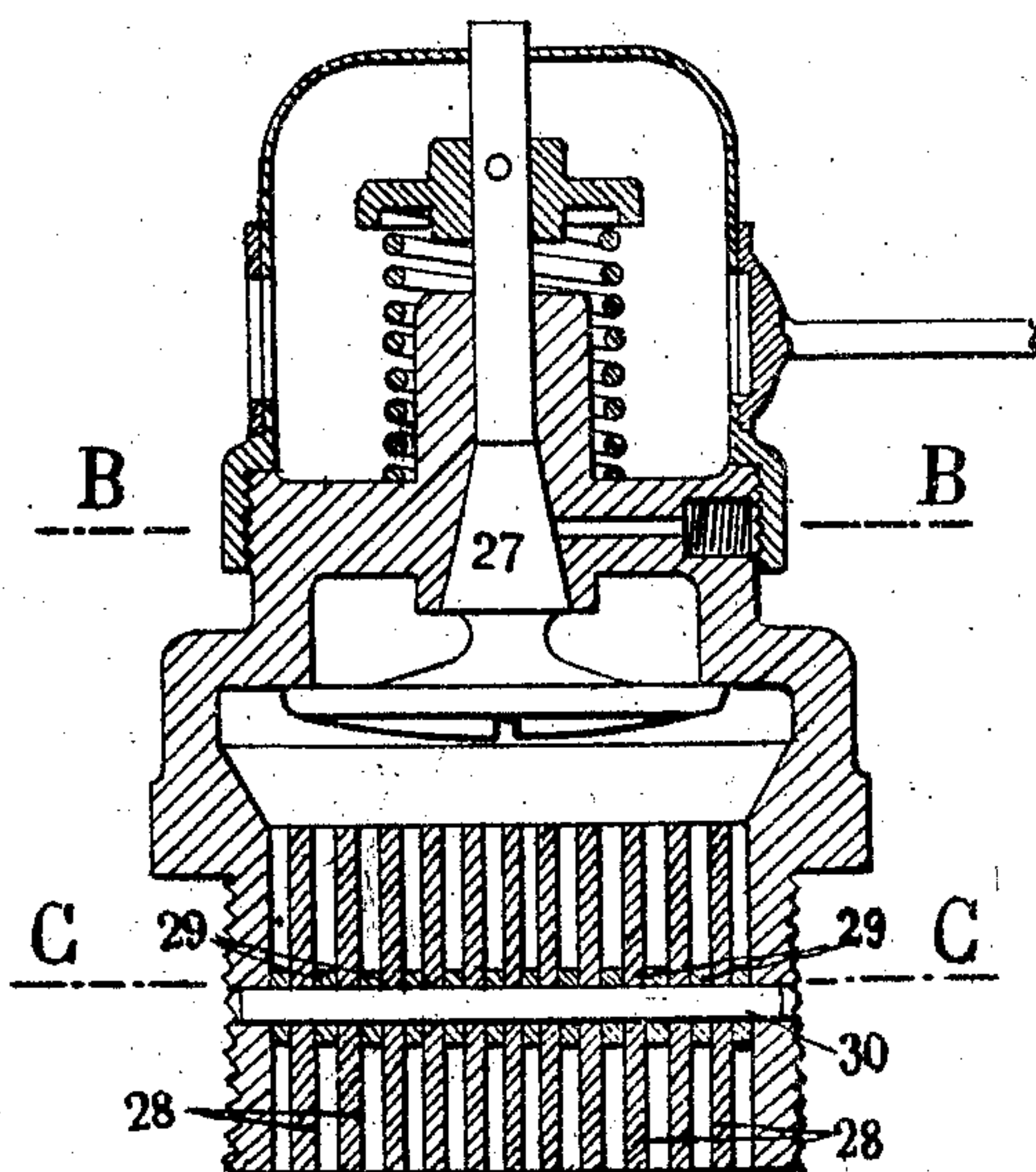
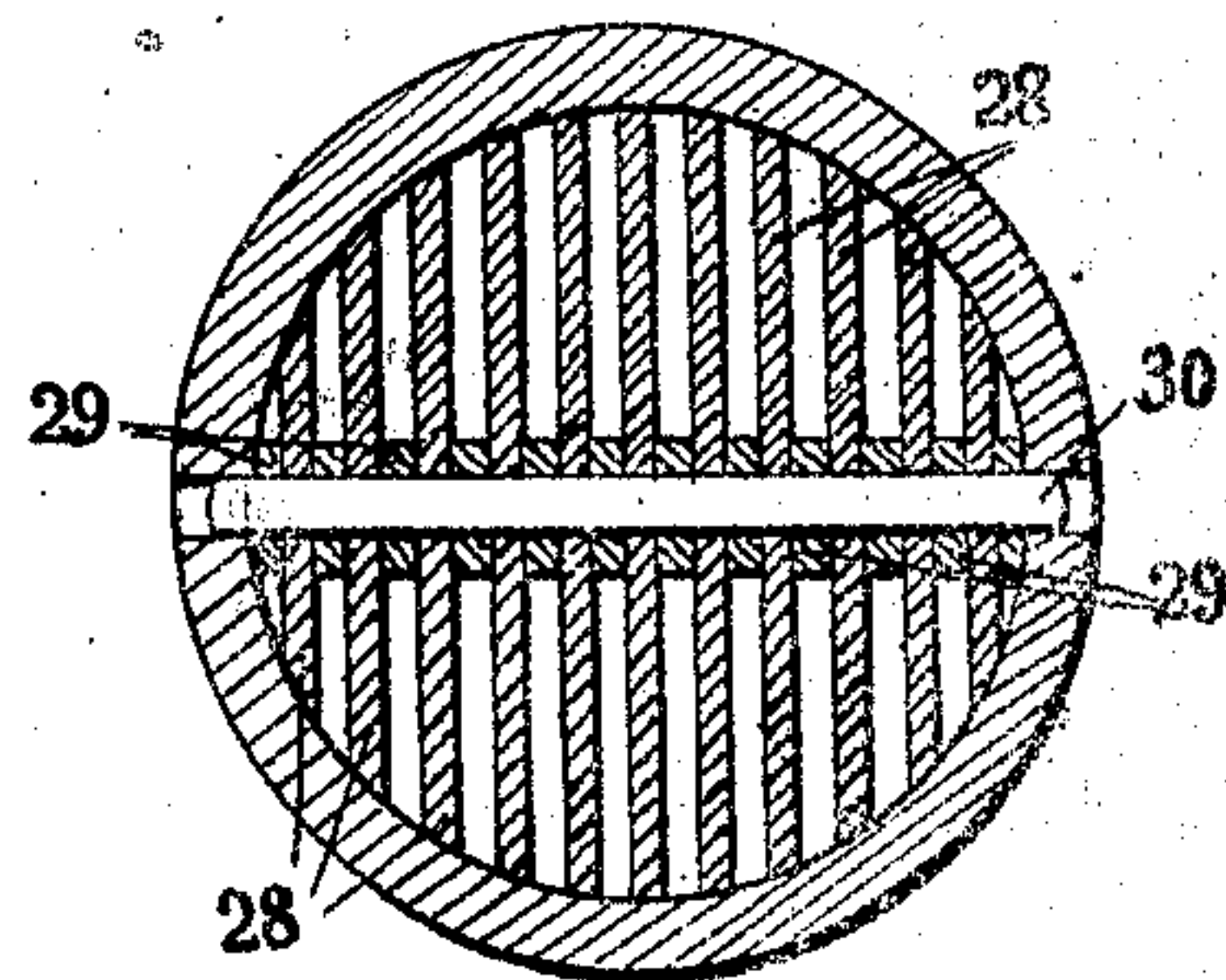


Fig. 6.



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2 SHEETS—SHEET 2.

Fig. 2.

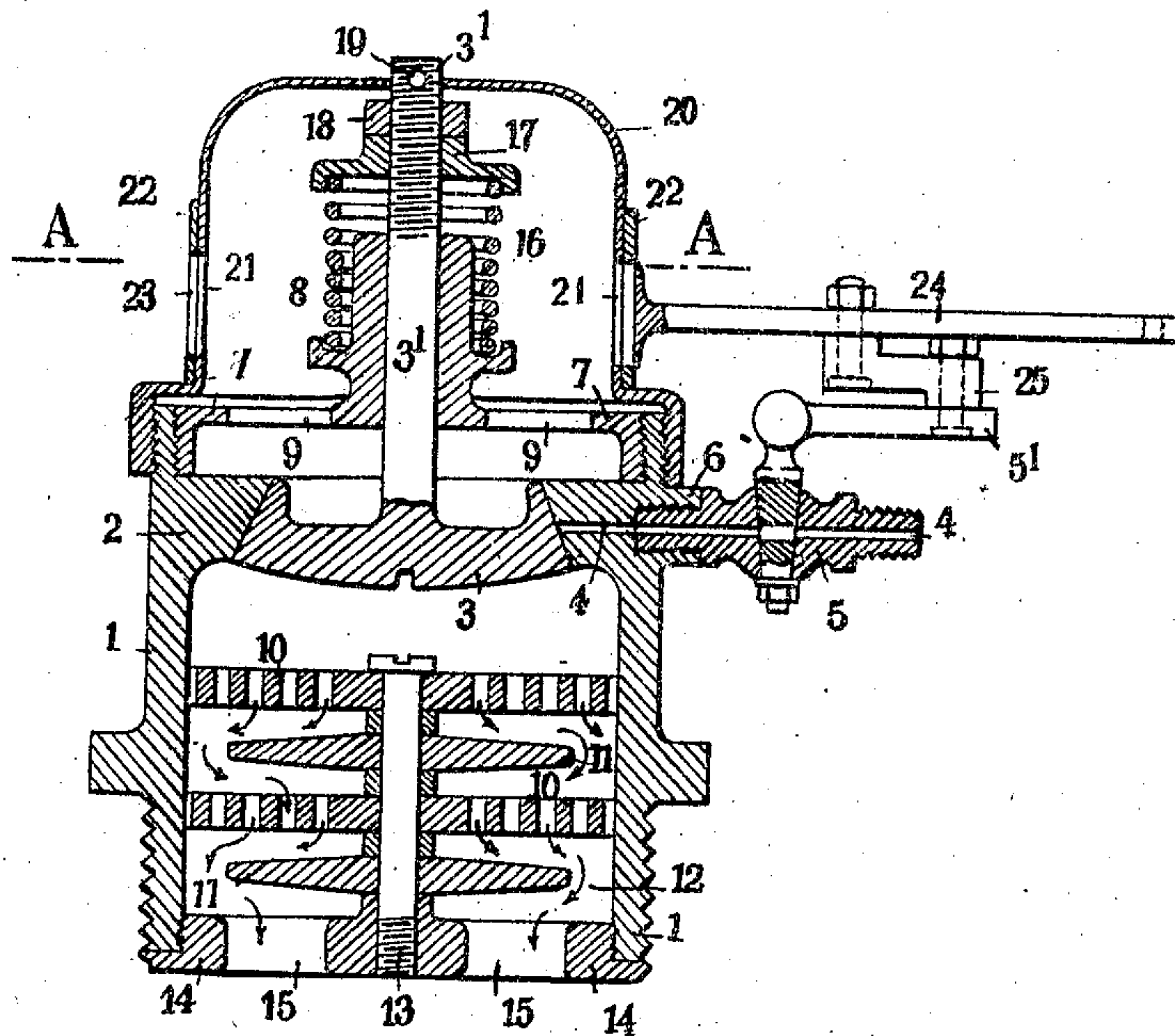
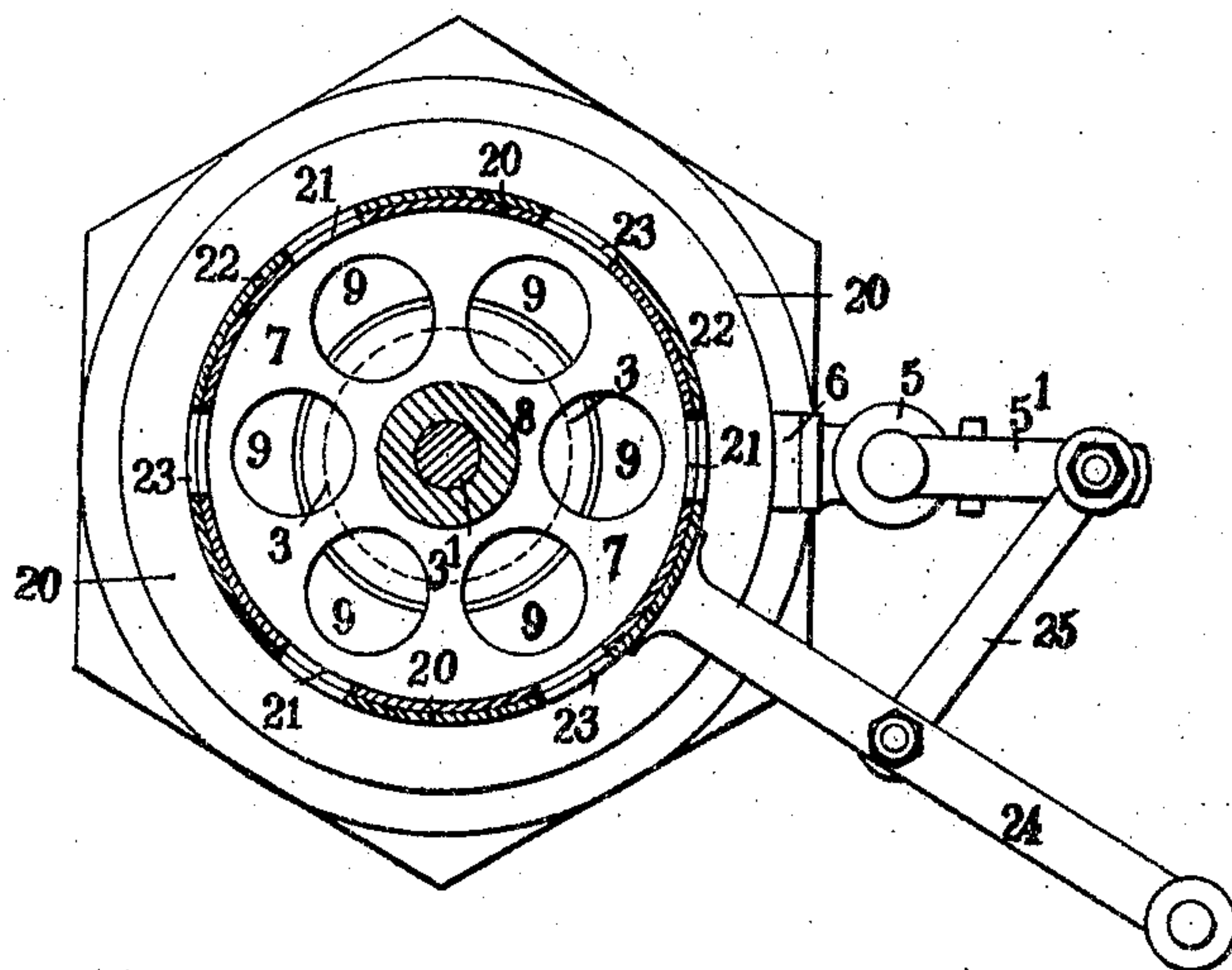


Fig. 3.



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# UNITED STATES PATENT OFFICE.

LÉON AUGUSTE MARTHA, OF PARIS, FRANCE.

INTERNAL-COMBUSTION ENGINE.

970,251.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed November 23, 1907. Serial No. 403,546.

*To all whom it may concern:*

Be it known that I, LÉON AUGUSTE MARTHA, of 24 Rue du Champ de Mars, in the city of Paris, Republic of France, engineer, have invented Improvements in Internal-Combustion Engines, of which the following is a full, clear, and exact description.

This invention relates to internal combustion motors and has for object a device for charging internal combustion motors and allowing the practical utilization of all liquid hydrocarbons.

The device is adapted to be screwed into an opening in the cylinder, and is designed to permit the liquid fuel to be atomized in a medium heated to a high temperature, and under a considerably reduced pressure in order to obtain a complete and rapid vaporization of the fuel. For this purpose the apparatus consists of a casing having a valve controlling the admission of the combustible liquid and the air, the liquid and the air being combined in such a manner that in every case the proportional quantity of air and fuel is such that it may form afterward a normal explosive mixture.

The invention is represented by way of example in the accompanying drawing in which:—

Figure 1 is an external view of the apparatus. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a horizontal section of the same apparatus on line A—A of Fig. 2. Fig. 4 shows a modified form of construction of the apparatus. Figs. 5 and 6 are two horizontal sections on lines B—B and C—C of Fig. 4.

As shown in Figs. 1 to 3 of the drawing, the present apparatus comprises a cylindrical body 1 which is screwed at its lower part upon the cylinder of the motor generally above the exhaust valve. The cylindrical body 1 is provided internally with a shoulder 2 forming a seat for the valve 3. In this shoulder is provided a channel 4 for the admission of the combustible liquid, the delivery of which is controlled by means of a cock 5 screwed upon a boss 6 (Fig. 2). At the upper part of the body 1 and above the shoulder 2 is screwed a diaphragm 7 which carries centrally a guiding sleeve 8 in which the rod 3' of the valve 3 slides. This diaphragm is provided with a certain number of openings 9 used for the admission of air (Figs. 2 and 3). Within the cylinder 1 is

arranged a mixer composed of several perforated disks 10 arranged one above the other and separated by solid washers 11. The perforated disks 10 enter with a slight friction inside the cylinder 1 while the washers 11 of smaller diameter form with the inner wall of the cylinder 1 an annular channel 12. This arrangement of the elements of the mixer are such as to permit the combustible liquid to be atomized, to mix with air and to volatilize under the action of the heat before entering the cylinder of the motor.

The perforated disks 10 and the solid washers 11 are threaded over a central rod 13 which is screwed upon the bottom 14 screwed in its turn to the basis of the body 1. The mixer can therefore be moved up or down as a single part by screwing or unscrewing the bottom 14. The bottom 14 is provided with a certain number of openings 15 through which the explosive mixture passes to reach the combustion chamber with which the present apparatus is in direct communication and of which it constitutes a part. The inlet valve 3 is maintained upon its seat by a spring 16 held by a nut 17 and a lock-nut 18 screwed upon the rod 3' of the valve.

In order to adjust the position of the valve, the rod 3' is provided at its top with an opening 19, through which may be inserted an ordinary metallic rod and the said metallic rod is held in the hand to fix the rod 3'. While so held, the nuts 17 and 18 are turned with respect to the rod 3', to move the nuts 17 toward or from the guide sleeve 8 in order to compress the spring 16 to a greater or less extent. To gain access to the nuts 17 and 18 the metal head 20 is unscrewed from the body 1 of the apparatus and after the valve is adjusted, the head is replaced.

As shown in Figs. 1 and 2 of the drawing, the upper end of the rod 3' extends slightly beyond the dome of a metallic head 20 screwed upon the upper part of the cylinder 1, so that by pressing with the finger upon the rod, the valve 3 may be depressed so that a compression relief will take place when the motor is started.

The head 20 arranged at the upper part of the cylinder 1 is provided at its bottom with a certain number of openings 21. On this head is arranged a movable sleeve 22 also provided with openings which can register with openings 21 or partly shut the



same, so as to allow the air to enter in a greater or less quantity into the apparatus. The sleeve 22 is operated by means of a rod 4 made in one part with the said sleeve and connected through a link 25 to the handle 5' of the cock 5. The regulation of the air through the sleeve, is thus rendered dependent upon that of the combustible liquid passing through the cock 5. This regulation can therefore be adjusted according to the power of the motor, so that whatever the opening left for the admission of the air through the sleeve, 22, may be, the quantity of liquid will be proportional to that of the air, so as to form at all times a normal explosive mixture. This regulation can be effected by hand or be automatically controlled by means of a governor. The valve 3 can also be controlled mechanically.

The apparatus thus arranged can operate in the following manner:—The liquid combustible is retained by the valve 3 until the piston has produced in the cylinder of the motor a sufficient vacuum. At this moment, the valve opens and allows a certain quantity of liquid and air to pass and to enter the mixer. As the latter is in direct communication with the combustion chamber, it reaches a very high temperature which produces at the same time an almost instantaneous vaporization of the liquid combustible and a very intimate mixture of the same with air.

The apparatus which has just been described is more particularly adapted to be used in connection with industrial motors having a small speed.

For the high-speed motors, the apparatus will be arranged as represented in Figs. 4 to 6. In this modification above the valve 3 closing the cylinder is arranged a cone 27 adapted to close the channel 4 for the admission of the liquid combustible. This arrangement prevents regurgitation into the tank containing this liquid.

In order to accelerate the admission of the mixture in the combustion chamber of the motor, the mixer is composed of metallic plates 28 arranged at right angles with reference to the valve 3. These plates are sepa-

rated the one from the others by small rings 29 passed along a spindle 30 and maintaining the said plates in position. The mixed fuel and the air are very finely divided in passing between the plates 28, thereby increasing the homogeneity of the mixture. The device is applicable to use with heavy oils since the high temperature to which the mixer is submitted and its direct communication with the combustion chamber permits the heavy oils to be vaporized and intimately mixed with air.

The above device has been described by way of example only but the forms, dimensions and details may of course vary without altering in any way the principle of the invention.

#### Claims:

1. An apparatus of the character specified, comprising an externally threaded tubular plug for engaging the cylinder of a motor, a mixing device within the plug and composed of perforated metallic disks separated by solid washers, a rod on which the disks and the washers are mounted, said washers being of less diameter than the diameter of the bore of the plug, a valve for controlling the supply of liquid fuel to the plug, said plug in the upper end thereof having a plurality of air orifices, and an apertured sleeve mounted on the valve adjacent to the orifices and adapted to control the extent of opening of the same.

2. An apparatus of the character specified, comprising a tubular plug having means for controlling the supply of liquid fuel and the supply of air, and a mixer in the bore of the plug, said mixer comprising alternate solid and perforated disks arranged in spaced relation, the solid disks being of lesser diameter than the bore of the plug.

The foregoing specification of my improvements in internal combustion motors signed by me this twelfth day of November 1907.

LÉON AUGUSTE MARTHA.

Witnesses:

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MAURICE H. PIGNET.